What is claimed is:

1. An amplified laser comprising

a substrate,

a semiconductor optical amplifier (SOA), coupled to the substrate and including an amplifier anode electrode and an amplifier cathode electrode, and

a semiconductor laser, coupled to the substrate and including a semiconductor laser anode electrode and a semiconductor laser cathode electrode,

wherein;

the semiconductor laser and the SOA are configured on the substrate so that the laser is optically coupled to the SOA; and

at least one of the semiconductor laser anode electrode and semiconductor laser cathode electrode is electrically coupled to at least one of the amplifier anode electrode and amplifier cathode electrode to receive operational power.

2. The amplified laser of claim 1, further comprising an electro-absorption modulated laser (EML) package that encloses the semiconductor laser and the SOA, the EML package including:

a first electrical contact electrically coupled to at least one of the anode electrode of the SOA and the anode electrode of the semiconductor laser;

a second electrical contact electrically coupled to at least one of the cathode electrode of the SOA and the cathode electrode of the semiconductor laser; and

an optical output port configured to provide an output amplified optical signal.

3. The amplified laser of claim 2, further comprising at least one of:

a thermo-electric cooler (TEC) thermally coupled to the substrate, the TEC electrically coupled to a third electrical contact and a fourth electrical contact of the EML package;

a feedback monitor optically coupled to the semiconductor laser, the feedback monitor being electrically coupled to a fifth electrical contact and a sixth electrical contact of the EML package; and

an optical modulator optically coupled to the SOA, the optical modulator being electrically coupled to a seventh electrical contact of the EML package.

4. The amplified laser of claim 1, wherein the cathode electrode of the semiconductor laser is electrically coupled to the anode electrode of the SOA whereby the semiconductor laser and SOA are connected in series.

5. The amplified laser of claim 4, further comprising an electronic component electrically coupled in parallel to at least one of the semiconductor laser and the SOA.

6. The amplified laser of claim 5, wherein the electronic component includes at least one of a resistor, a capacitor, an inductor, and an integrated circuit.

7. The amplified laser of claim 1, wherein the anode electrode of the semiconductor laser is electrically coupled to the cathode electrode of the SOA whereby the semiconductor laser and the SOA are connected in series.

8. The amplified laser of claim 7, further comprising an electronic component electrically coupled in parallel to one of the semiconductor laser and the SOA.

9. The amplified laser of claim 8, wherein the electronic component includes at least one of a resistor, a capacitor, an inductor, and an integrated circuit.

10. The amplified laser of claim 1, wherein;

the cathode electrode of the semiconductor laser is electrically coupled to the cathode electrode of the SOA; and

the anode electrode of the semiconductor laser is electrically coupled to the anode electrode of the SOA, whereby the semiconductor laser and the SOA are connected in parallel.

11. The amplified laser of claim 10, further comprising an electronic component electrically coupled in series to one of the semiconductor laser and the SOA.

12. The amplified laser of claim 11, wherein the electronic component includes at least one of a resistor, a capacitor, an inductor, and an integrated circuit.

13. A monolithic amplified semiconductor laser comprising:

a substrate including a distributed feedback laser (DFB) portion and a semiconductor optical amplifier (SOA) portion, the DFB portion including a diffraction grating;

an active layer formed on the substrate extending over the DFB portion and the SOA portion, the active layer further including a first end and a second end,

a semiconductor layer formed on the active layer, and

an electrical contact layer formed on the semiconductor layer, the electrical contact layer including a DFB electrode portion, an SOA electrode portion, and a resistive coupler electrically coupled between the DFB electrode portion and SOA electrode portion to control current division between the DFB portion and the SOA portion.

wherein;

the first end of the active layer is located proximate to the SOA portion of the substrate and is substantially transparent; and

the second end of the active layer is located proximate to the DFB portion of the substrate and is substantially reflective.

14. The monolithic amplified semiconductor laser of claim 13, further comprising an electro-absorption modulated laser (EML) package that encloses the DFB portion and the SOA portion, the EML package including:

a first electrical pin electrically coupled to the electrical contact layer;

a second electrical pin electrically coupled to the substrate; and

an optical output port configured to provide an output amplified optical signal.

15. The monolithic amplified semiconductor laser of claim 14, comprising at least one of:

a thermo-electric cooler (TEC) thermally coupled to the substrate, the TEC electrically coupled to a third electrical contact and a fourth electrical contact of the EML package;

a feedback monitor optically coupled to the semiconductor laser, the feedback monitor electrically coupled to a fifth electrical contact and a sixth electrical contact of the EML package; and

an optical modulator optically coupled to the SOA, the optical modulator electrically coupled to a seventh electrical contact of the EML package.

16. The monolithic amplified semiconductor laser of claim 13, wherein;

the substrate includes a first III/V material having a first conductivity type; and

the semiconductor layer includes a second III/V material having a second conductivity type, the second conductivity type being different that the first conductivity type.

17. The monolithic amplified semiconductor laser of claim 16, wherein:

the first III/V material is selected from a group consisting of InP, GaAs, InSb, AlGaAs, and InGaAsP; and

the second III/V material is selected from a group consisting of InP, GaAs, InSb, AlGaAs, and InGaAsP.

18. The monolithic amplified semiconductor laser of claim 13, wherein the active layer includes at least one of a bulk gain material and a quantum well structure.

19. The monolithic amplified semiconductor laser of claim 13, wherein the substantially transparent first end includes at least one of a tilted surface, an antireflective surface coating, and a buried facet.

20. The monolithic amplified semiconductor laser of claim 13, wherein the substantially reflective second end includes at least one of a cleaved facet, a dielectric mirror, and a reflective surface coating.

21. A method for forming a monolithic amplified semiconductor laser, comprising the steps of:

a) providing a substrate base including a first end, a second end, and a substrate base index of refraction;

b) forming a grating layer over the substrate base, the grating layer having a grating index of refraction different from the substrate base index of refraction;

c) defining and etching the grating layer to form a grating base section proximate to the first end of the substrate base, the grating base section having a grating period;

d) forming a top substrate layer over the substrate base and the grating base section, the top substrate layer having a substrate index of refraction different from the grating index of refraction;

e) forming an active layer on the top substrate layer having a waveguide index of refraction different from the substrate index of refraction;

f) forming a semiconductor layer on the active layer, the semiconductor layer including a semiconductor layer index of refraction different from the waveguide index of refraction;

g) defining and etching the semiconductor layer and the active layer to form a mesa structure, the mesa structure having a rear end adjacent to the first end of the substrate base and an output end adjacent to the second end of the substrate base

h) forming an electrode layer on the semiconductor layer, the electrode layer including two separate electrodes sections electrically coupled by a resistive coupler.

i) forming a substantially transparent facet at the output end of the mesa structure; and

j) forming a substantially reflective facet at the rear end of the mesa structure.

22. The method of claim 19, wherein;

one or more of steps b, d, e, and f use metal organic chemical vapor deposition (MOCVD);

step c uses at least one of phase mask lithography and anisotropic etching.